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### Effects of Nicotine on Free Acetylcholine in the Hippocampus During Learning.

A number of investigators have shown that nicotine, in small doses, facilitates learning in rats. Previous work in this laboratory has strongly suggested that nicotine-mediated learning facilitation is the result of a direct enhancement of the consolidating memory trace.

The current objectives are:

- (a) To determine the effects of nicotine on the release of free acetylcholine (a probably neurotransmitter in the brain) from the hippocampus (a brain area possibly involved in learning) of restrained but awake rabbits.
- (b) To perform similar experiments in rats that are actively learning a conditioned avoidance response.

The following approach will be used:

- (a) Push-pull cannulae will be inserted into the hippocampus (unilaterally) of rabbits and rats and the brain perfused with Locke's salt solution.
- (b) Analysis of levels of free (released) acetylcholine will be performed with a bioassay method, the dorsal longitudinal muscle of the leech, which is very sensitive to small amounts of acetylcholine.
- (c) In rats, the technique will be developed so that acetylcholine can be measured during actual learning of an avoidance response.
- (d) Nicotine will be given to determine how it affects the release of acetylcholine and how these changes correlate with speed of learning.

Plans are to correlate results obtained in this project with earlier nicotine-learning work in this laboratory.

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